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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,633	05/09/2006	Becky Ellington	US030461US	1422

28159 7590 06/04/2009

PHILIPS INTELLECTUAL PROPERTY & STANDARDS
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EXAMINER	
BRUTUS, JOEL F	

ART UNIT	PAPER NUMBER
3768	

MAIL DATE	DELIVERY MODE
06/04/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/578,633	ELLINGTON ET AL.	
	Examiner	Art Unit	
	JOEL F. BRUTUS	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/9/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 3-7 are objected to because of the following informalities: “transmitter comprises a transmitter”. It should have been a "transmitter”. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Regarding claims 1-2, the phrase "motive device" renders the claim(s) indefinite because the claim(s) include(s) elements not actually disclosed (those encompassed by "motive device"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-15 rejected under 35 U.S.C. 103(a) as being unpatentable over Entrekin et al (US Pat: 5,305,756) in view of Okunuki et al (US Pat: 5,460,179).

Regarding claims 1 and 8, Entrekin et al teaches in FIG. 6 a single piston or annular array transducer with a surface geometry that will result in convergence in the azimuthal direction and divergence in the elevation direction. The emitting surface of the transducer is approximately saddle-shaped, causing divergence in the elevational direction of the axis of shaft 52 and convergence in the azimuthal direction. This convergence is illustrated by lines (56, 58, see fig 6) which are drawn orthogonal to the edge surfaces of the opposing sides of the transducer in the azimuthal plane. The transducer is oscillated back and forth to scan the volumetric region in front of the transducer through oscillation of the shaft to which it is attached. The oscillatory motion is indicated by the arrow 54 [see fig 6]. As it moves the transducer will insonify the volumetric region in front of the transducer. Since the transducer beam profile is focused in the azimuthal direction and divergent in the elevational direction by virtue of the transducer surface geometry, the resulting image will exhibit three-dimensional projection of echoes in the volumetric region with good lateral resolution [see column 5 lines 55-65].

Entrekin et al teaches real-time ultrasonic images are provided through a transducer which utilizes conventional focusing of the ultrasonic beam in the azimuth direction and a divergent beam in the elevation direction [see column 2 lines 25-30]. In figs 1 and 2a-2b, Entrekin et al teaches production of fan shaped beam in the elevation direction and the beam is divergent about an axis [see column 3 lines 38-45].

FIG. 7 illustrates the electronic production of a fan-shaped beam in the elevational direction. In FIG. 7 the transducer is a two-dimensional array of elements.

Like the embodiment of FIG. 3, there is a series of elements aligned in the azimuthal direction. In addition, each element in the azimuthal direction is sub-diced in the elevational direction. Three of these sub-elements 80a, 80b, and 80c are shown in FIG. 7. The plurality of elements in the elevational direction allows electronic generation of the fan-shaped beam, as contrasted with the earlier discuss-ad techniques which rely upon lenses or the geometry of the element surface. In this embodiment the times of actuation of the sub-elements control beam divergence in the elevational direction. For example, in FIG. 7 sub-element 80b would be actuated first, followed in rapid succession by sub-elements 80a and 80c in order to produce a beam which is divergent in the elevational direction. Thus, electronic control of the actuation times of the elevational sub-elements will in turn control the generation of the fan-shaped beam [see column 6 lines 9-30].

Entrekin et al doesn't specifically teach a motive device.

However, Entrekin et al teaches oscillating and actuating the transducer [see above].

However, Okunuki et al teaches an ultrasonic transducer assembly includes a transducer unit having an array transducer composed of a plurality of transducer elements for transmitting and receiving ultrasonic waves to effect electronic scanning, a rocking mechanism for rocking the transducer unit angularly about a virtual rotative axis which is determined on an electronic scanning plane produced by the array transducer and located in the vicinity of the contact portion of the casing [see abstract].

The rocking mechanism includes a pair of guide members having arc-shaped guide routes concentrically arranged with the virtual rotative axis as its center, linking members for linking the transducer unit with the guide members in such a way that the transducer unit can be rocked angularly about the virtual rotative axis; and a driving mechanism for reciprocating moving the transducer unit along the arc-shaped guide routes through the linking members [see abstract [see abstract]. In this transducer assembly, a three-dimensional echo data acquiring region of which apex is located on the virtual rotative axis can be produced based on the shift of the electronic scanning plane which is affected by the rocking movement of the transducer unit [see abstract].

Okunuki et al also teaches in fig 6-7, the transducer is sweeping in forward/reverse direction [see figs 6-7).

Therefore, one with ordinary skill in the art at the time the invention was made to combine these references by using the rocking and driving mechanisms as taught by Okunuki et al; for the purpose of activating the transducer to apply ultrasonic beams in a desired region of interest. The rocking and driving mechanism are also used as a transmitter to cause the transducer to transmit beams.

Regarding claims 2-7, and 9-12, all other limitations are taught as set forth by the above combination. Entrekin et al further teaches the transducer is oscillated back and forth to scan the volumetric region in front of the transducer through oscillation of the shaft to which it is attached. The oscillatory motion is indicated by the arrow 54 [see fig 6]. Okunuki et al further teaches in fig 1-2, a transducer unit is adapted to be movable

reciprocatingly in the right and left directions (the arrow directions A in FIG. 1) within the casing [see column 1 lines 57-65].

Regarding claims 13-15, all other limitations are taught as set forth by the above combination. Okunuki et al further teaches as shown in FIG. 1, the transducer assembly includes a transducer unit which is movably arranged within a casing of the transducer assembly. This transducer unit is adapted to be movable reciprocatingly in the right and left directions (the arrow directions A in FIG. 1) within the casing. The transducer unit includes an array transducer (not shown) which is composed of a plurality of ultrasonic transducer elements. These transducer elements are arranged on a transmitting and receiving surface 12a of the transducer unit 12 which would, in use, face to a patient 14 to be examined [see column 1 lines 57-65]. In fig 1, Okunuki et al teaches scanning in parallel scan planes [see figs 1-2].

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL F. BRUTUS whose telephone number is (571)270-3847. The examiner can normally be reached on Mon-Fri 7:30 AM to 5:00 PM (Off alternative Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571)272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. F. B./
Examiner, Art Unit 3768

/Long V Le/
Supervisory Patent Examiner, Art Unit 3768